

Australian Standard™

Plastics—Glass filament reinforced plastics (GRP)—Methods of test

Method 10: Determination of the initial ring stiffness of glass filament reinforced plastics pipes

1 SCOPE

This Standard sets out two alternative methods for determining the initial ring stiffness of glass filament reinforced plastics (GRP) pipes. Either a constant deflection or a constant load test method may be used.

NOTE: The constant deflection method is to be the referee method used in the case of a dispute.

2 PRINCIPLE

A section of pipe is subjected to a compressive load and the initial ring stiffness is determined from the load-deflection relationship. The principles of the alternative tests are as follows:

- (a) *Constant deflection test* A diametral, compressive load is applied to the specimen so that a deflection of $3.0 \pm 0.5\%$ is reached within 60 ± 10 s. The deflection is maintained for a further 2 min, and the load and deflection are measured at the end of this interval (see Figure 1).
- (b) *Constant load test.*

A diametral compressive load is applied to the specimen so that a deflection of $3.0 \pm 0.5\%$ is reached within 60 ± 10 s. The load is then maintained for a further 2 min, and the load and the deflection are measured at the end of this interval (see Figure 2).

3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard.

AS	
3572	Plastics—Glass filament reinforced plastics (GRP)—Methods of test
3572.1	Method 1: Preparation of glass filament reinforced plastics test specimens
3572.4	Method 4: Determination of the dimensions of glass filament reinforced plastics pipes



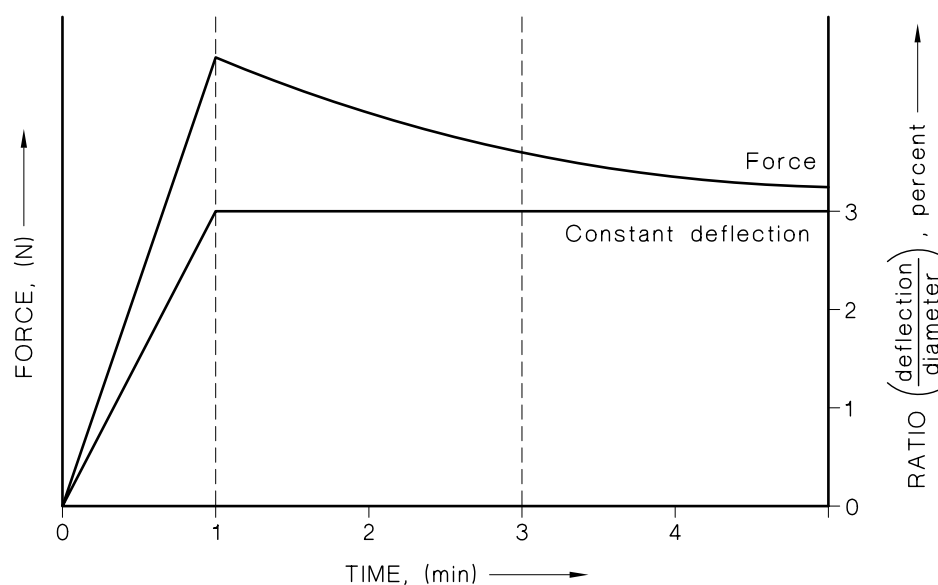


FIGURE 1 GRAPH FROM CONSTANT DEFLECTION TEST

4 CONSTANT DEFLECTION TEST METHOD

4.1 General

In the case of a dispute, the constant deflection method shall be the referee method.

4.2 Apparatus

The following is required:

- Testing machine** A test machine capable of applying the load described in Clause 4.8, through two bearing plates or beam bars (see Figure 3).
- Loading plates** Loading plates, if used, shall be not less than 5 mm thick and shall not bend or deform during the test. Their length shall be equal to or greater than the specimen length.
- Beam bars** For pipe specimens with a nominal diameter less than 300 mm, beam bars, if used, shall be 20 ± 5 mm diameter. For larger diameter pipes the bars shall be 50 ± 5 mm diameter.
- Force and deflection measuring equipment** The accuracy of measurement of force within $\pm 1.0\%$ of the indicated value. For measurement of deflection, the accuracy shall be within $\pm 1.0\%$ of the maximum measured value of change or 0.1 mm, whichever is the larger.

4.3 Preparation of test specimens

Test specimens shall be taken from normal production pipes. Before testing, each test specimen shall have its ends squared and cleaned. It shall not have any burrs, notches or other markings, which may cause premature failure in subsequent ring stress tests. The length of the test specimen shall be as specified in Table 1.

A tolerance of $\pm 5\%$ on the length is permitted.

Six equally spaced straight lines shall be drawn along the length of the test specimen.

NOTE: This specimen may be used later for the initial ring deflection test of AS 3572.11, where specimen failure can occur.

TABLE 1
LENGTH OF TEST SPECIMEN

millimetres	
Nominal size of pipe (DN)	Length (L)
< 300	DN
≥ 300 ≤ 1 500	300
> 1 500	0.2DN

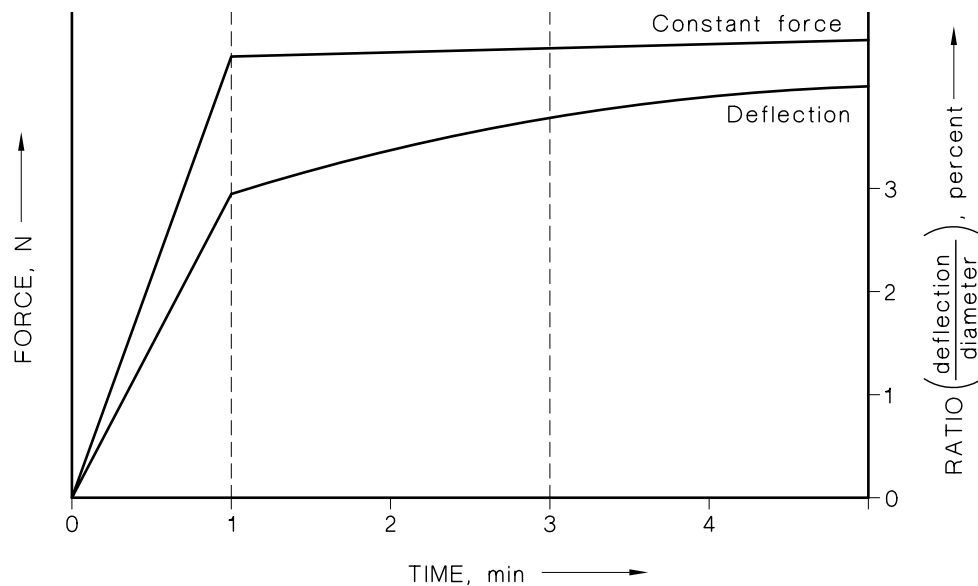


FIGURE 2 GRAPH FROM CONSTANT LOAD TEST

4.4 Number of test specimens

One test specimen shall be tested.

4.5 Conditioning

The test specimens shall be conditioned in accordance with AS 3572.1. Except for referee tests, conditioning shall be at ambient conditions.

4.6 Test conditions

The test shall be carried out in air at a temperature of $23 \pm 2^\circ\text{C}$.

4.7 Measurement of length and mean diameter

The length of the test specimen shall be measured to an accuracy of 1 mm at six places equally spaced around the circumference. The length (L) of the test specimen shall be the mean length of these measurements.